

CLAIMS

1. A method for generating hydrogen from a hydrocarbon comprising:
having a supercritical water reformer (SCWR);
providing said SCWR both supercritical water and at least one hydrocarbon;
using supercritical water to reform said hydrocarbon into hydrogen; and
capturing said hydrogen.
2. The method of claim 1 wherein said hydrocarbon is included in at least one of: gasoline and diesel fuel.
3. The method of claim 1 wherein said hydrocarbon comprises a paraffin.
4. The method of claim 1 wherein said hydrocarbon comprises a naphthene
5. The method of claim 1 wherein said hydrocarbon comprises an olefin
6. The method of claim 1 wherein said hydrocarbon comprises an aromatic.
7. The method of claim 1 wherein said hydrocarbon comprises at least one of the group consisting of: methane, propane, ethane, octane, and dodecane.
8. The method of claim 1 wherein said hydrocarbon comprises a biomass fuel.
9. The method of claim 1 wherein in said step of providing sulfur also provided to said SCWR.
10. The method of claim 1 wherein in said step of using, said hydrocarbon is reformed into a synthesis gas including hydrogen and carbon monoxide.
11. The method of claim 10 wherein prior to said step of capturing, said synthesis gas is passed through a forward water-gas shift (WGS) reactor to increase the amount of hydrogen in the synthesis gas.

12. The method of claim 1 wherein said step of capturing said hydrogen is captured as a chemical hydride.
13. The method of claim 12 wherein in said chemical hydride is a metal hydride.
14. The method of claim 1 wherein said step of capturing said hydrogen is captured using carbon nanotubes.
15. The method of claim 1 wherein said step of providing also includes providing oxygen into said SCWR.
16. The method of claim 15 wherein said oxygen is provided as a component of air.
17. The method of claim 1 further comprising the steps of monitoring said SCWR and controlling said step of providing based on said monitoring to make said step of using more efficient.
18. A system for reforming diesel fuel into hydrogen comprising:
 - feeds for water and diesel fuel;
 - a supercritical water (SCW) reactor;
 - a water-gas shift (WGS) reactor; and
 - a capturing system;wherein, water and diesel fuel are fed by said feeds; wherein said water is placed into a supercritical state; wherein, said SCW reactor reforms said diesel fuel into a synthesis gas including hydrogen and carbon monoxide and outputs said synthesis gas;
 - wherein said synthesis gas output by said SCW reactor is fed into said WGS reactor which converts said carbon monoxide into carbon dioxide and hydrogen and outputs an output gas including a higher percentage of hydrogen to carbon monoxide compared to said synthesis gas; and

wherein said hydrogen in said output gas is captured by said capturing system.

19. The system of claim 18 wherein said capturing system captures said hydrogen in a chemical hydride.
20. The system of claim 19 wherein said chemical hydride is sodium hydride.
21. The system of claim 19 wherein said chemical hydride is boron hydride.
22. The system of claim 18 wherein oxygen is fed into said SCW reactor in conjunction with said diesel fuel and said water.
23. The system of claim 22 wherein said oxygen is fed as a component of air.
24. The system of claim 18 further comprising a sensor and control system for monitoring at least one of said syntheses gas and said output gas and adjusting said feeds based on said sensing.
25. The system of claim 24 wherein said sensor and control system comprises a gas chromatograph.
26. A system for generating hydrogen from hydrocarbons comprising:
 - means for creating a mixture of diesel fuel, water, and air;
 - means for taking said mixture and increasing pressure and temperature to make said water supercritical;
 - means for obtaining a synthesis gas including hydrogen from said mixture;
 - means for increasing the percentage of hydrogen in said synthesis gas; and
 - means for capturing said hydrogen in a form useful as fuel for a fuel cell.